

**CLAIMS:** *The following is a listing of all claims entered in the national stage with their status and the text of all active claims.*

1) (CURRENTLY AMENDED) Product consisting in a sample containing at least one kind of excited isomer nuclides in which at least one said excited isomer nuclide has at least one metastable state that deexcites by emitting gamma rays, called hereafter deexcitation gamma rays, characterized:

- (a) in that groups of two or several excited nuclei of the aforesaid excited isomer nuclides of the aforesaid sample, are entangled between them, the aforementioned sample being called thereafter by convention the “entangled” sample, and presenting quantum coupling between some of the excited nuclei of the aforesaid excited isomer nuclides,
- (b) and, in that the measurable half-life, called thereafter the “variable” half-life, on at least one said excited isomer nuclide of said “entangled” sample, during its natural deexcitation producing said deexcitation gamma rays, is variable, due to the quantum coupling between said entangled excited nuclei of the aforesaid nuclide, the initial said “variable” half-life of the aforesaid excited isomer nuclide being strictly lower than the constant half-life of the said excited isomer nuclide given by the table of isotopes, said constant half-life thereafter being called the theoretical half-life of the aforesaid excited isomer nuclide, and the value of the said “variable” half-life of the aforesaid excited isomer nuclide varying from the value of the said initial “variable” half-life to the value of the said theoretical half-life of the aforesaid excited isomer nuclide, then increasing beyond the value of the aforesaid theoretical half-life.

2) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that ~~it includes an~~ said “entangled” sample ~~containing~~ comprises said excited nuclei of at least one kind of said isomer nuclides having at least one said metastable state with a duration of its theoretical half-life from one microsecond to 50 years, for example, Niobium (93Nb41m), Cadmium (111Cd48m), Cadmium (113Cd48m), Cesium

(<sup>135</sup>Ce<sup>55m</sup>), Indium (<sup>115</sup>In<sup>49m</sup>), Tin (<sup>117</sup>Sn<sup>50m</sup>), Tin (<sup>119</sup>Sn<sup>50m</sup>), Tellurium (<sup>125</sup>Te<sup>52m</sup>), Xenon (<sup>129</sup>Xe<sup>54m</sup>), Xenon (<sup>131</sup>Xe<sup>54m</sup>), Hafnium (<sup>178</sup>Hf<sup>72m</sup>), Hafnium (<sup>179</sup>Hf<sup>72m</sup>), Iridium (<sup>193</sup>Ir<sup>77m</sup>), or Platinum (<sup>195</sup>Pt<sup>78m</sup>), ~~and some radioactive isotopes.~~

3) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that ~~it includes an~~ said “entangled” sample ~~containing~~ comprises said excited nuclei of at least one kind of said excited isomer nuclides ~~having at least one metastable state with a duration of half-life from one microsecond to 50 years, for example, Niobium (<sup>93</sup>Nb<sup>41m</sup>), Cadmium (<sup>111</sup>Cd<sup>48m</sup>), Cadmium (<sup>113</sup>Cd<sup>48m</sup>), Cesium (<sup>135</sup>Ce<sup>55m</sup>), Indium (<sup>115</sup>In<sup>49m</sup>), Tin (<sup>117</sup>Sn<sup>50m</sup>), Tin (<sup>119</sup>Sn<sup>50m</sup>), Tellurium (<sup>125</sup>Te<sup>52m</sup>), Xenon (<sup>129</sup>Xe<sup>54m</sup>), Xenon (<sup>131</sup>Xe<sup>54m</sup>), Hafnium (<sup>178</sup>Hf<sup>72m</sup>), Hafnium (<sup>179</sup>Hf<sup>72m</sup>), Iridium (<sup>193</sup>Ir<sup>77m</sup>), or Platinum (<sup>195</sup>Pt<sup>78m</sup>), and some~~ being radioactive isotopes.

4) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that ~~it includes~~ said “entangled” sample, comprising said excited nuclei, is in any physical or any chemical form, for example in the form of solid in sheet or powder, or in the form of fluid or gas (case of Xenon for example), ~~said “entangled” sample containing a proportion of~~ at least one or several isotopes aforesaid excited isomer nuclides, for example, Niobium (<sup>93</sup>Nb<sup>41m</sup>), Cadmium (<sup>111</sup>Cd<sup>48m</sup>), Cadmium (<sup>113</sup>Cd<sup>48m</sup>), Cesium (<sup>135</sup>Ce<sup>55m</sup>), Indium (<sup>115</sup>In<sup>49m</sup>), Tin (<sup>117</sup>Sn<sup>50m</sup>), Tin (<sup>119</sup>Sn<sup>50m</sup>), Tellurium (<sup>125</sup>Te<sup>52m</sup>), Xenon (<sup>129</sup>Xe<sup>54m</sup>), Xenon (<sup>131</sup>Xe<sup>54m</sup>), Hafnium (<sup>178</sup>Hf<sup>72m</sup>), Hafnium (<sup>179</sup>Hf<sup>72m</sup>), Iridium (<sup>193</sup>Ir<sup>77m</sup>), Platinum (<sup>195</sup>Pt<sup>78m</sup>), ~~or of alloys, mixtures, or chemical compounds incorporating a proportion of one or several aforesaid isotopes.~~

5) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that ~~it includes~~ said “entangled” sample, comprising said excited nuclei, is ~~in any physical or any chemical form, for example in the form of solid in sheet or powder, or in the form of fluid or gas (case of Xenon for example), said “entangled” sample containing a proportion of one or several isotopes, for example, Niobium (<sup>93</sup>Nb<sup>41m</sup>), Cadmium (<sup>111</sup>Cd<sup>48m</sup>), Cadmium (<sup>113</sup>Cd<sup>48m</sup>), Cesium (<sup>135</sup>Ce<sup>55m</sup>), Indium (<sup>115</sup>In<sup>49m</sup>), Tin (<sup>117</sup>Sn<sup>50m</sup>), Tin (<sup>119</sup>Sn<sup>50m</sup>), Tellurium (<sup>125</sup>Te<sup>52m</sup>), Xenon (<sup>129</sup>Xe<sup>54m</sup>), Xenon (<sup>131</sup>Xe<sup>54m</sup>), Hafnium (<sup>178</sup>Hf<sup>72m</sup>), Hafnium (<sup>179</sup>Hf<sup>72m</sup>), Iridium (<sup>193</sup>Ir<sup>77m</sup>), Platinum~~

~~(<sup>195</sup>Pt<sup>78m</sup>)~~ the form of alloys, mixtures, or chemical compounds incorporating a proportion of said excited nuclei from one or several aforesaid ~~isotopes~~ excited isomer nuclides.

6) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that said “entangled” sample underwent a physical and / or a chemical transformation after its manufacture.

7) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that ~~the measurable value of~~ said initial “variable” half-life of at least one of the aforesaid excited isomer nuclides of the “entangled” sample is strictly lower than the theoretical half-life of the aforesaid excited isomer nuclide, for example ranging between 10% and ~~400%~~ 90% of the theoretical ~~value~~ half-life.

8) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that ~~the~~ said “entangled” sample contains said excited nuclei from at least two said excited isomer nuclides.

9) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that ~~the~~ said “entangled” sample contains said excited nuclei from at least one excited isomer nuclide in at least two said metastable states.

10) (CURRENTLY AMENDED) Manufacturing process of the product according to claim 1 in which one uses amongst other things:

(a) at least one kind of said isomer nuclide having at least one said metastable state,

(b) irradiation by gamma rays,

characterized in that one prepares a sample containing nuclei of at least one said isomer nuclide having at least one said metastable state, by irradiation by means of gamma rays comprising at least ~~partly~~ some groups of entangled gamma rays, of a sufficient energy to excite certain of the aforesaid nuclei of the said isomer nuclide in at least one said metastable state, the aforementioned entangled gamma rays being generated, for example, either by a source of gamma rays emitted in a cascade, or by a generator of gamma rays coming from the Bremsstrahlung of accelerated particles,

such as electrons, alpha particles, or protons, the aforementioned groups of entangled gamma rays, ~~when they are entangled~~, exciting the aforementioned corresponding nuclei of the aforesaid isomer nuclide distributed in the aforementioned irradiated sample that is produced, qualified in the continuation by convention “entangled” sample.

11) (CURRENTLY AMENDED) Method according to claim 10 further characterized in that the said initial “variable” half-life of the ~~aforesaid product~~ obtained aforesaid “entangled” sample varies with the duration of said irradiation and / or with the power of ~~the source of gamma~~ said irradiation.

12) (CURRENTLY AMENDED) Use of the product according to ~~any of the claims 1,2, 3, 4, 5, 6 or 7~~ claim 1 characterized in that one employs the aforementioned deexcitation gamma radiation, emitted by natural deexcitation of the aforementioned “entangled” sample, as a source initially emitting a high dose of radiation, then a decreasing dose, and followed by a low dose of radiation for a long time, to irradiate the environment of the said “entangled” sample.

13) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that ~~one employs an~~ the aforesaid “entangled” sample deexcitation gamma radiation is used to conduct one or more physicochemical reactions.

14) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that one employs ~~an~~ the aforesaid “entangled” sample in the form of a solution.

15) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that one employs ~~an~~ the aforesaid “entangled” sample after having undergone a physical transformation or a chemical conversion ~~after~~ following its manufacture.

16) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that ~~one employs a~~ the aforementioned deexcitation gamma radiation ~~with~~ comprises at least two lines of different energies emitted by at least two aforesaid excited isomer nuclides to irradiate the environment of said “entangled” sample.

17) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that ~~one employs a~~ the aforementioned deexcitation gamma radiation ~~with~~ comprises at

least two lines of different energies emitted by the same aforesaid excited isomer nuclide to irradiate the environment of said “entangled” sample.

18) (WITHDRAWN) ~~Product according to anyone of claims 1, 2, 3, 4, 5, 6, or 7 for medical use.~~ Use according to claim 12 further characterized for a medical treatment.

*Clean text of the national stage entered claims is provided for convenience hereafter:*

1) (CURRENTLY AMENDED) Product consisting in a sample containing at least one kind of excited isomer nuclides in which at least one said excited isomer nuclide has at least one metastable state that deexcites by emitting gamma rays, called hereafter deexcitation gamma rays, characterized:

- (a) in that groups of two or several excited nuclei of the aforesaid excited isomer nuclides of the aforesaid sample, are entangled between them, the aforementioned sample being called thereafter by convention the “entangled” sample, and presenting quantum coupling between some of the excited nuclei of the aforesaid excited isomer nuclides,
- (b) and, in that the measurable half-life, called thereafter the “variable” half-life, on at least one said excited isomer nuclide of said “entangled” sample, during its natural deexcitation producing said deexcitation gamma rays, is variable, due to the quantum coupling between said entangled excited nuclei of the aforesaid nuclide, the initial said “variable” half-life of the aforesaid excited isomer nuclide being strictly lower than the constant half-life of the aforesaid excited isomer nuclide given by the table of isotopes, said constant half-life thereafter being called the theoretical half-life of the said excited isomer nuclide, and the value of the said “variable” half-life of the aforesaid excited isomer nuclide varying from the value of the said initial “variable” half-life to the value of the said theoretical half-life of the aforesaid excited isomer nuclide, then increasing beyond the value of the aforesaid theoretical half-life.

2) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that said “entangled” sample comprises said excited nuclei of at least one kind of said isomer nuclides having at least one said metastable state with a duration of its theoretical half-life from one microsecond to 50 years, for example, Niobium ( $^{93}\text{Nb}41\text{m}$ ), Cadmium ( $^{111}\text{Cd}48\text{m}$ ), Cadmium ( $^{113}\text{Cd}48\text{m}$ ), Cesium ( $^{135}\text{Cs}55\text{m}$ ), Indium ( $^{115}\text{In}49\text{m}$ ), Tin ( $^{117}\text{Sn}50\text{m}$ ), Tin ( $^{119}\text{Sn}50\text{m}$ ), Tellurium ( $^{125}\text{Te}52\text{m}$ ), Xenon ( $^{129}\text{Xe}54\text{m}$ ), Xenon ( $^{131}\text{Xe}54\text{m}$ ), Hafnium ( $^{178}\text{Hf}72\text{m}$ ), Hafnium ( $^{179}\text{Hf}72\text{m}$ ), Iridium

(<sup>193</sup>Ir<sup>77m</sup>), or Platinum (<sup>195</sup>Pt<sup>78m</sup>).

3) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that said “entangled” sample comprises said excited nuclei of at least one kind of said excited isomer nuclides being radioactive isotopes.

4) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that said “entangled” sample, comprising said excited nuclei, is in any physical or any chemical form, for example in the form of solid in sheet or powder, or in the form of fluid or gas (case of Xenon for example), said “entangled” sample containing a proportion of at least one or several aforesaid excited isomer nuclides, for example, Niobium (<sup>93</sup>Nb<sup>41m</sup>), Cadmium (<sup>111</sup>Cd<sup>48m</sup>), Cadmium (<sup>113</sup>Cd<sup>48m</sup>), Cesium (<sup>135</sup>Ce<sup>55m</sup>), Indium (<sup>115</sup>In<sup>49m</sup>), Tin (<sup>117</sup>Sn<sup>50m</sup>), Tin (<sup>119</sup>Sn<sup>50m</sup>), Tellurium (<sup>125</sup>Te<sup>52m</sup>), Xenon (<sup>129</sup>Xe<sup>54m</sup>), Xenon (<sup>131</sup>Xe<sup>54m</sup>), Hafnium (<sup>178</sup>Hf<sup>72m</sup>), Hafnium (<sup>179</sup>Hf<sup>72m</sup>), Iridium (<sup>193</sup>Ir<sup>77m</sup>), Platinum (<sup>195</sup>Pt<sup>78m</sup>).

5) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that said “entangled” sample, comprising said excited nuclei, is in the form of alloys, mixtures, or chemical compounds incorporating a proportion of said excited nuclei from one or several of aforesaid excited isomer nuclides.

6) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that said “entangled” sample underwent a physical and / or a chemical transformation after its manufacture.

7) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that the said initial “variable” half-life of at least one of the aforesaid excited isomer nuclides of the “entangled” sample is strictly lower than the theoretical half-life of the aforesaid excited isomer nuclide, for example ranging between 10% and 90% of the theoretical half-life.

8) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that said “entangled” sample contains said excited nuclei from at least two said excited isomer nuclides.

9) (CURRENTLY AMENDED) Product according to claim 1 further characterized in that said “entangled” sample contains said excited nuclei from at least one excited isomer nuclide in at least two said metastable states.

10) (CURRENTLY AMENDED) Manufacturing process of the product according to claim 1 in which one uses amongst other things:

- (a) at least one kind of said isomer nuclide having at least one said metastable state,
- (b) irradiation by gamma rays,

characterized in that one prepares a sample containing nuclei of at least one said isomer nuclide having at least one said metastable state, by irradiation by means of gamma rays comprising at least some groups of entangled gamma rays, of a sufficient energy to excite certain of the aforesaid nuclei of the said isomer nuclide in at least one said metastable state, the aforementioned entangled gamma rays being generated, for example, either by a source of gamma rays emitted in a cascade, or by a generator of gamma rays coming from the Bremsstrahlung of accelerated particles, such as electrons, alpha particles, or protons, the aforementioned groups of entangled gamma rays, exciting the aforementioned corresponding nuclei of the aforesaid isomer nuclide distributed in the aforementioned irradiated sample that is produced, qualified in the continuation by convention “entangled” sample.

11) (CURRENTLY AMENDED) Method according to claim 10 further characterized in that the said initial “variable” half-life of the obtained aforesaid “entangled” sample varies with the duration of said irradiation and / or with the power of said irradiation.

12) (CURRENTLY AMENDED) Use of the product according to claim 1 characterized in that one employs the aforementioned deexcitation gamma radiation, emitted by natural deexcitation of the aforementioned “entangled” sample, as a source initially emitting a high dose of radiation, then a decreasing dose, and followed by a low dose of radiation for a long time, to irradiate the environment of the said “entangled” sample.

13) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that the aforesaid “entangled” sample deexcitation gamma radiation is used to conduct one

or more physicochemical reactions.

14) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that one employs the aforesaid “entangled” sample in the form of a solution.

15) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that one employs the aforesaid “entangled” sample after having undergone a physical transformation or a chemical conversion following its manufacture.

16) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that the aforementioned deexcitation gamma radiation comprises at least two lines of different energies emitted by at least two aforesaid excited isomer nuclides to irradiate the environment of said “entangled” sample.

17) (CURRENTLY AMENDED) Use according to claim 12 further characterized in that the aforementioned deexcitation gamma radiation comprises at least two lines of different energies emitted by the same aforesaid excited isomer nuclide to irradiate the environment of said “entangled” sample.

18) (CURRENTLY AMENDED) Use according to claim 12 further characterized for a medical treatment.